

WHAT IS CLAIMED IS:

1. A system for recognizing a call switch-over to a CDMA 2000 1X system (1X system) when a call drop of a hybrid access terminal with respect to a CDMA 2000 1xEV-DO system (1xEV-DO system) occurs, the system comprising:

the hybrid access terminal operated in a 1X mode in relation to a 1X system for receiving a voice signal transmission service or a low-rate data transmission service from the 1X system and in a 1xEV-DO mode in relation to the 1xEV-DO system for receiving a high-rate data transmission service from the 1xEV-DO system, the hybrid access terminal in traffic with the 1xEV-DO system being switched into the 1X mode to perform a call connection with the 1X system and to transmit/receive voice and/or data to/from the 1X system when voice signals or low-rate data are received from the 1X system;

a 1X transceiver for transmitting/receiving voice signals and/or data to/from the hybrid access terminal;

a 1X controller for controlling a transmission service of the 1X transceiver;

a mobile switching center for providing a communication access path of the 1X system with respect to a communication call transmitted from the hybrid access terminal, storing information of the hybrid access terminal registered in the mobile switching center in a home location register (HLR), and storing information of hybrid access terminals located in a region of the mobile switching center;

a 1xEV-DO access network transceiver subsystem for transmitting/receiving high-rate data to/from the hybrid access terminal; and

a 1xEV-DO access network controller for controlling a high-rate data transmission service of the 1xEV-DO access network transceiver subsystem, transmitting a message inquiring whether or not voice
5 signals or low-rate data are received in the hybrid access terminal to the mobile switching center when a signal having a level below a predetermined level is received from the hybrid access terminal if a call drop occurs between the 1xEV-DO system and the hybrid access
10 terminal in traffic with the 1xEV-DO system, and recognizing that the hybrid access terminal is switched into the 1X mode when a message capable of checking whether or not the voice signals or low-rate data are received in the hybrid access terminal is received from
15 the mobile switching center.

2. The method according to claim 1, wherein the hybrid access terminal receiving data in traffic with the 1xEV-DO system is periodically switched into the 1X
20 mode in a predetermined period of time so as to check whether or not voice signals are received through the 1X system and returns to the 1xEV-DO mode.

3. The method according to claim 1, wherein the
25 hybrid access terminal is set to the 1X mode in an idle state thereof in order to make communication with the 1X system and is periodically switched into the 1xEV-DO mode in a predetermined period of time so as to check whether or not data are received through the 1xEV-DO
30 system and returns to the 1X mode.

4. The method according to claim 1, wherein the 1xEV-DO access network controller transmits a message inquiring whether or not voice signals are received in
35 the hybrid access terminal to the mobile switching

center together with MIN and ESN information regarding the hybrid access terminal.

5 5. The method according to claim 1, wherein the hybrid access terminal is switched from the 1xEV-DO mode into the 1X mode by tracking frequency of the 1X system using a searcher module under the control of a mobile station modem (MSM) chip.

10 6. The method according to claim 1, wherein a TDMA (time division multiple access) method is utilized in a case of a forward link transmitting data from the 1xEV-DO system to the hybrid access terminal, and

15 a CDMA (code division multiple access) method is utilized in a case of a reverse link transmitting data from the hybrid access terminal to the 1xEV-DO system.

20 7. The method according to claim 6, wherein a hard handoff is carried out in case of the forward link, which transmits data from the 1xEV-DO system to the hybrid access terminal, by transmitting data with maximum power without performing power control, and

25 a soft handoff is carried out in case of the reverse link while performing the power control with respect to each hybrid access terminal.

8. The method according to claim 7, wherein the forward link includes:

30 a pilot channel used for transmitting a pilot signal allowing the 1xEV-DO system to track the hybrid access terminal;

 a MAC (medium access control) channel used for controlling the reverse link;

35 a control channel used for transmitting a broadcast message or a direct message for directly

controlling a specific hybrid access terminal from the 1xEV-DO system to the hybrid access terminal; and

5 a traffic channel used for transmitting only packet data from the 1xEV-DO system to the hybrid access terminal.

9. The method according to claim 8, wherein the pilot channel is used as a reference for coherent detection of a wireless base station having the 1xEV-DO system by means of the hybrid access terminal.

10. The method according to claim 8, wherein the hybrid access terminal receives at least one pilot signal through the pilot channel and accesses to a wireless base station, which has transmitted a pilot signal having greatest intensity.

11. The method according to claim 1, wherein the 1xEV-DO access network controller transmitting/receiving the high-rate data to/from the hybrid access terminal calculates a predetermined time when a call drop of the hybrid access terminal occurs, and determines whether or not a signal having a level below a predetermined level is received from the hybrid access terminal when the predetermined time lapses.

12. A method for recognizing a call switch-over from a CDMA 2000 1xEV-DO system (1xEV-DO system) to a CDMA 2000 1X system (1X system) when a hybrid access terminal is switched from a 1xEV-DO mode to a 1X mode, the method comprising the steps of:

- (a) sequentially initializing the 1X mode and the 1xEV-DO mode of the hybrid access terminal such that the hybrid access terminal stays in an idle state;
- 35 (b) performing dual monitoring with respect to the

1X mode and the 1xEV-DO mode by using the hybrid access terminal in a state that the hybrid access terminal stays in the idle state;

5 (c) allowing the hybrid access terminal to make a call-connection with the 1xEV-DO system in the 1xEV-DO mode and enter a traffic state, thereby enabling the hybrid access terminal to transmit/receive high-rate data;

10 (d) occurring a call drop between the hybrid access terminal and the 1xEV-DO system;

(e) making a call-connection with the 1X system when the hybrid access terminal is switched from the 1xEV-DO mode to the 1X mode;

15 (f) transmitting a message inquiring whether or not voice signals or low-rate data are received in the hybrid access terminal to a mobile switching center; and

20 (g) receiving a message capable of checking whether or not the voice signals or low-rate data are received in the hybrid access terminal from the mobile switching center and recognizing that the hybrid access terminal has been switched from the 1xEV-DO mode to the 1X mode.

25 13. The method as claimed in claim 12, wherein, in step (a), the hybrid access terminal initializes the 1xEV-DO mode by using system parameters obtained when initializing the 1X mode.

30 14. The method as claimed in claim 12, wherein, in step (c), the hybrid access terminal receiving data in traffic with the 1xEV-DO system is periodically switched into the 1X mode in a predetermined period of time so as to check whether or not voice signals or low-rate data are received through the 1X system and returns to the
35 1xEV-DO mode.

15 15. The method as claimed in claim 12, wherein, in
step (e), the call switch-over from the 1xEV-DO mode
into the 1X mode is performed by tracking frequency of
the 1X system using a searcher module under the control
of a mobile station modem (MSM) chip accommodated in the
hybrid access terminal.

10 16. The method as claimed in claim 12, wherein, in
step (f), a 1xEV-DO access network controller transmits
a message inquiring whether or not voice signals or low-
rate data are received in the hybrid access terminal to
the mobile switching center together with MIN and ESN
information regarding the hybrid access terminal.

15 17. The method as claimed in claim 12, wherein, in
step (c), the call-connection is performed after a
connection and a session is set between the hybrid
access terminal and the 1xEV-DO system.

20 18. The method as claimed in claim 12, wherein, in
step (a), the hybrid access terminal is set to the 1X
mode in an idle state thereof in order to make
communication with the 1X system and is periodically
switched into the 1xEV-DO mode in a predetermined period
of time so as to check whether or not high-rate data are
received through the 1xEV-DO system, in the 1X mode, and
returns to the 1X mode.

30 19. The method as claimed in claim 17, wherein the
session is set by requesting a unicast access terminal
identifier (UATI) to the 1xEV-DO system and being
assigned the UATI from the 1xEV-DO system,

the UATI is an identifier (ID) of the hybrid
35 access terminal representing a number assigned from the

1xEV-DO system to the hybrid access terminal, and

a parameter, which is to be used in a setup of high-rate data call, power control and handoff, is set when the session is set between the hybrid access
5 terminal and the 1xEV-DO system.

20. The method as claimed in claim 12, wherein a TDMA (time division multiple access) method is utilized in a case of a forward link transmitting data from the
10 1xEV-DO system to the hybrid access terminal, and

a CDMA (code division multiple access) method is utilized in a case of a reverse link transmitting data from the hybrid access terminal to the 1xEV-DO system.

15 21. The method as claimed in claim 20, wherein the forward link includes:

a pilot channel used for transmitting a pilot signal allowing the 1xEV-DO system to track the hybrid access terminal;

20 a MAC (medium access control) channel used for controlling the reverse link;

a control channel used for transmitting a broadcast message or a direct message for directly controlling a specific hybrid access terminal from the
25 1xEV-DO system to the hybrid access terminal; and

a traffic channel used for transmitting only packet data from the 1xEV-DO system to the hybrid access terminal.

30 22. The method as claimed in claim 21, wherein the pilot channel is used as a reference for coherent detection of a wireless base station having the 1xEV-DO system by means of the hybrid access terminal.

35 23. The method as claimed in claim 21, wherein the

hybrid access terminal receives at least one pilot signal through the pilot channel and accesses to a wireless base station, which has transmitted a pilot signal having greatest intensity.